UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

JUL 2 7 2007

Mr. David K. Paylor, Director
Virginia Department of Environmental Quality
629 East Main Street
Richmond, Virginia 23219

Dear Mr. Paylor:

The Virginia Department of Environmental Quality (VADEQ) adopted amendments to the Virginia water quality standard regulations in Sections 25-260-5, 50, 310, 480, and 540 of VAC on June 1, 2006.

Before adopting these amendments, VADEQ published a Notice of Regulatory Action (NOIRA) on February 21, 2005, and proposed language in a Notice of Public Comment and Hearing (NOPC) on January 23, 2006, in the *Virginia Register of Regulations* and accepted public comments in writing throughout the NOIRA and NOPC processes, and at a public hearing on March 26, 2006. VADEQ forwarded the new and revised water quality standards, Attorney General certification, and supporting material to EPA for review in accordance with §303(c)(2)(A) of the CWA. The United States Environmental Protection Agency (EPA) Region III received this package on January 19, 2007.

EPA has completed its review of VADEQ's new or revised water quality standard regulations. I am pleased to inform you that EPA approves these revisions as consistent with the Clean Water Act and its regulations. EPA's review and decision is set forth in more detail in the enclosure entitled, "Environmental Protection Agency Region III State of Virginia Water Quality Standards List of 2007 New and Revised Items".

On behalf of the Region, I would like to commend VADEQ for its diligent efforts to update its regulations by initiating the incorporation of site-specific nutrient criteria for Lakes and Reservoirs into its water quality standards (WQS). For almost a decade, EPA has emphasized the importance of establishing numeric nutrient criteria. Incorporating criteria for nutrients, which are identified as one of the top three causes of use impairment in US waters, will improve the overall quality of water, reduce excess inputs of nutrients, and prevent any further nutrient-based impairment to Virginia's State waters. Based on the scientifically defensible methodology provided by VADEQ, the regulations adopted by Virginia meets the requirements of EPA regulations at 40 C.F.R. 131.11.

Under the Endangered Species Act, EPA has an obligation to consult with the United States Fish and Wildlife Services (USFWS) to determine if our approval of revisions to a State's water quality standard regulations will adversely affect or jeopardize threatened and endangered species and their critical habitat. EPA's biological evaluation found no adverse affect to threatened or endangered species. EPA has completed consultation with USFWS, and received concurrence with the Agency's findings on June 15, 2007. Enclosed are copies of the biological evaluation prepared by EPA and the response submitted by the USFWS.

Should you have any questions concerning this correspondence, please contact me or have your staff contact Tiffany Crawford at (215) 814-5776.

Sincerely,

Jon M. Capacasa, Director
Water Protection Division

Enclosures (4)

cc: Allan Pollock, VADEQ
Jean Gregory, VADEQ
Cindy Kane, USFWS

Enclosure 1: Environmental Protection Agency, Region III State of Virginia Water Quality Standards List of 2007 New and Revised Items

Section Revisions	Description of Revision	EPA Decision Rationale
PART I. Surface Water Standards With General, Statewide Application		
9 VAC 25-260-5. Definitions	Definition for the term "Algicides" added	EPA reviewed new definitions in the context of the new and revised Water Quality Standards listed below. Approval of the WQS listed below includes approval of the use of the terms defined here as they are applied in the approved WQS.
9 VAC 25-260-5. Definitions	Definition for the term "Epilimnion" added	See above.
9 VAC 25-260-5. Definitions	Definition for the term "Lacustrine" added	See above.
9 VAC 25-260-5. Definitions	Definition for the term "Man-made lake or reservoir" added	See above.
9 VAC 25-260-5. Definitions	Definition for the term "Natural lake" added	See above.
9 VAC 25-260-50. Numerical criteria for dissolved oxygen, pH, and maximum temperature.***	Language was added to clarify the implementation of dissolved oxygen criteria in waters that are naturally low in dissolved oxygen; specifically man-made lakes and rservoirs in Class III (Nontidal Waters - Coastal Piedmont), IV (Mountainous Zone Waters), or VI (Natural Trout) waters.	Meets the requirements of EPA regulations at 40 C.F.R. 131.11. Based on scientifically defensible methods, as discussed in Enclosure 2.
PART II. Standards With More Specific Application		
9 VAC 25-260-187. Criteria for man-made lakes and reservoirs to protect aquatic life and recreational designated uses from the impacts of nutrients	The entire regulation at 25-260-187 was revised to provide numeric nutrient criteria for the man-made lakes listed in subsection B of this regulation. Nutrient criteria have been established for Chla a and TP according to the waterbodies defined use designation.	Meets the requirements of EPA regulations at 40 C.F.R. 131.11. Based on scientifically defensible methods, as discussed in Enclosure 2.
9 VAC 25-260-310. Special standards and requirements	Subsection cc. was added to illustrate the new site-specific narrative and numeric nutrient criteria for Mountain Lake; one of two natural lakes in the Commonwealth of Virginia.	Meets the requirements of EPA regulations at 40 C.F.R. 131.11. Based on scientifically defensible methods, as discussed in Enclosure 2.

Enclosure 1: Environmental Protection Agency, Region III State of Virginia Water Quality Standards List of 2007 New and Revised Items

9 VAC 25-260-310. Special standards and requirements	Subsection dd. was added to illustrate the new site-specific narrative and numeric nutrient criteria for Lake Drummond; one of two natural lakes in the Commonwealth of Virginia.	Meets the requirements of EPA regulations at 40 C.F.R. 131.11. Based on scientifically defensible methods, as discussed in Enclosure 2.
PART VIII. Nutrient Enriched Waters		
9 VAC 25-260-480. Chowan and Dismal Swamp (Albemarle Sound Subbasin)	Specific standards dd., in section 3, class III, were added to provide additional description of the characteristics of Lake Drummond in the Albemarle Sound Subbasin.	Meets the requirements of EPA regulations at 40 C.F.R. 131.11. Based on scientifically defensible methods, as discussed in Enclosure 2.
9 VAC 25-260-540. New River Basin	Specific standards cc., in section 1, class ii, were added to provide additional description of the characteristics of Little Stony Creek within the New River Basin; and specific standards PWS, NEW-44, in section 2m, class IV, were changed to PWS, NEW 5 to provide aa refined description of the uses associated with Claytor Lake within the New River Basin.	Meets the requirements of EPA regulations at 40 C.F.R. 131.11. Based on scientifically defensible methods, as discussed in Enclosure 2.

Enclosure 2

EPA Region III Approval Rationale
Virginia Nutrient Criteria for Lakes and Reservoirs

The new nutrient criteria for lake and reservoirs submitted by Virginia consist of the following:

Table – VA Criteria to protect fishery recreation and aquatic life, applicable April – October.

Fishery Type:	Warm-water		Coolwater		Coldwater (trout)		Managed / Fertilized	
	chl-a (µg/L)	TP (µg/L)	chl-a (µg/L)	TP (µg/L)	chl-a (µg/L)	TP (µg/L)	chl-a (µg/L)	TP (µg/L)
Eco-region:								
11	35	40	25	20	10	10		
9	35	40	25	30			60	40
14	60	40	25	20				

Virginia developed these criteria using an effects-based approach. These criteria apply to 116 manmade impoundments that are currently monitored by the State, or scheduled to be monitored during the next assessment period. In addition, Virginia adopted site-specific criteria for two natural lakes, based on natural background:

Lake	Chlorophyll *a*	Phosphorus
Mountain Lake	6 µg/l	8 µg/l (Ortho-Phosphorus)
Lake Drummond	35 µg/l	40 µg/l (Total Phosphorus)

Recommendations for criteria development came from an Academic Advisory Committee (AAC) formed by the VA Water Resources Research Center (VWRRC). The committee consisted of scientists from several VA colleges and universities. Based on State data, and the expert knowledge of the AAC, the committee developed the scientific approach that VADEQ used to develop nutrient criteria for the State lakes and reservoirs. Scientific justification for VADEQ's approach can be found in *January 2005 Report of the Academic Advisory Committee to Virginia Department of Environmental Quality: Freshwater Nutrient Criteria*, submitted by the VWRRC in January 2005, with associated addendums submitted in June 2005, and July 2005.

The AAC made the following recommendations:

- Consider natural lakes and constructed impoundments separately for nutrient criteria development;

- The protection of designated uses should be the basis for establishing criteria. Thus, recreational fish population status could be an indicator of suitability for aquatic life; and
- Assess nutrient impairment using Chl *a*, TP, and DO parameters only.

Chl *a* and TP Criteria Derivation for 116 Man-made Impoundments

The AAC recommended Chl *a* as the primary nutrient criterion instead of TN or TP because of its close tie to biological effects, as an indicator of algal biomass. In contrast, the AAC's research did not show as close of a relationship between TN and TP and nutrient impairment in VA lakes in comparison to Chl *a*. The AAC found that in Virginia TP-Chl *a* relationships are more variable for man-made impoundments. Virginia did adopt TP criteria to apply in impoundments where algicide is applied. In impoundments where algicide is applied, the Chl *a* test would not indicate an algal problem despite the fact that application of algicide was necessary. In this situation, a TP criterion would be a more appropriate indicator. The ACC found a TN criterion to be less useful in controlling nutrient impairment because some algae are nitrogen-fixing, making the availability of nitrogen irrelevant to algal development. These recommendations from the AAC were consistent with Virginia's *Nutrient Enriched Waters Policy*, published in State WQS in 1988, which established TP as the limiting nutrient, and TN as the parameter with the least correlation to nutrient impairment in State waters (*referenced in EPA guidance* EPA 822-B00-001).

Seasonal (April - October) numeric nutrient criteria were developed based on nutrient ecoregion and fishery type. The criteria apply only during the warmer months because algal impairment is a warm weather problem. EPA developed a national nutrient ecoregion map to assist States in determining the basic topography associated with the aquatic environments that nutrient criteria would be developed for (EPA 822-B00-001). Virginia decided to incorporate this assessment tool into their criteria development process.

In developing criteria for manmade impoundments, the State chose to focus criteria development using fisheries-based criteria because the health of a recreational fish population is a good indicator of suitability for aquatic life use. Maximum nutrient concentrations were derived to sustain good to excellent recreational fisheries, by fish type and ecoregional location. A historical VADEQ database was used to identify impoundments with adequate data and retention time for criteria development. The status of recreational fishery in each impoundment was rated on a scale of 1(poor) to 5(excellent) by Virginia Department of Game and Inland Fisheries (VDGIF) biologists, in response to requests by the AAC. Each reservoir was classified as one of the following types based on the professional knowledge of Dr. John Ney of the AAC:

- Coolwater Fisheries;
- Coldwater (Trout) Fisheries;
- Fertilized Fisheries; and
- Warmwater Fisheries.

Nutrient Criteria were statistically derived using the 90th percentile for Chl *a* and the median for TP by ecoregion and fishery type, based on lacustrine water chemistry data down to one meter for reservoirs with good or excellent fishery ratings.

Special Standards for Natural Lakes

The AAC recommended that natural lakes and constructed impoundments be considered separately. The rationale for this was that there is extensive scientific evidence that these systems respond differently to nutrient inputs (impoundments tend to have larger watersheds, lower retention times, and more non-algal turbidity and require management as a result of having been constructed). The AAC recommended separate criteria be developed for the two natural lakes in the State: Lake Drummond and Mountain.

The watersheds for VA's two natural lakes are protected. Mountain Lake is located on property protected by conservation easements and other measures. The property is owned by a hotel consortium interested in protecting the lake as a tourist attraction for their hotel. Additionally, two state universities have biological monitoring stations on the lake. Lake Drummond is located in the Great Dismal Swamp, which is a United States Fish and Wildlife Service (USFWS) wildlife refuge. Therefore the distinctive and excellent water quality of both lakes (oligotrohic for Mountain Lake and dystrophic for Lake Drummond) has been maintained.

- Mountain Lake and Lake Drummond are as different in water quality and morphometrically and hydrologically aspects from each other as they are from reservoirs;
- Mountain Lake is deep, clear, small watershed, stratified in summer (with good dissolved oxygen throughout) and oligotrophic, least disturbed;
- Lake Drummond, is shallow, unstratified, eutrophic, brown / black water continual turnover, low pH, good dissolved oxygen, limited access, balanced food web. Limited man-made impacts except through air deposition of mercury.

The criteria were based on the natural background concentrations at the lakes.

Dissolved Oxygen (DO) application

In accordance with VADEQ's *Nutrient Enriched Waters Policy*, established in the 1980's, Virginia has had existing numeric criteria for DO of 4 mg/l (minimum) and 5 mg/l (daily average) in their WQS. Based on the AAC's recommendations, VADEQ has clarified the DO criteria apply only to the epilimnion in thermally-stratified man-made impoundments. The rationale for monitoring DO criteria in the epilimnion only is that if a man-made waterbody meets the nutrient criteria, then any low DO should be attributed to natural conditions and not nutrient impairment. If the waterbody does not experience any stratification, then the DO criteria applies throughout the water column.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

March 8, 2007

Ms. Cindy Kane
U.S. Fish and Wildlife Service
Virginia Field Office
6669 Short Lane
Gloucester, Virginia 23061

Dear Ms. Kane:

The United States Environmental Protection Agency, Region III (EPA) would like to provide, as a courtesy, the United States Fish and Wildlife Service's (USFWS) with the enclosed biological evaluation (BE) of the revised criteria as adopted by Virginia State Control Board on June 1, 2006. The determinations associated with Virginia's water quality standards revisions included the determination of "No Effect." More details are provided within the BE itself.

Please do not hesitate to contact me at (215) 814 3392 or email me at atkinson.cheryl@epa.gov.

Sincerely,

Cheryl Atkinson

Cheryl Atkinson
Water Quality Standards Coordinator

Enclosure: Biological Evaluation

Enclosure

Biological Evaluation of Lake Nutrient Criteria in Virginia

for the Approval of

TITLE 9 VACS 25-260 WATER QUALITY STANDARDS REGULATIONS

March 2007

U.S. Environmental Protection Agency Region III

Biological Evaluation
Commonwealth of Virginia
New or Revised Water Quality Standards

Background

Runoff from "non-point" sources such as urban, agricultural, and forest land, combined with discharges from industrial and municipal sources, has resulted in excessive levels of nutrients, particularly phosphorus, in some of the Commonwealth of Virginia's (Commonwealth) waters, including lakes and reservoirs. Although nutrients such as phosphorus are necessary for the growth of algae which are an essential part of the food chain, problems occur when an overabundance of these nutrients cause excessive growths of algae. Excessive amounts of aquatic plants, particularly algae, can discolor the water, create taste and odor problems for water supply mangers, reduce water clarity, and block sunlight from submerged aquatic vegetation. Another side effect of excessive algal blooms is impairment of recreational activities in the water body due to the aesthetically displeasing appearance of the water. The most serious problem resulting from algal growth occurs when the plants die and decay; at that time, they deplete the oxygen level of the water to the point that fish and other aquatic organisms cannot survive. It is important, therefore, to develop nutrient controls so that the symptoms of nutrient enrichment, i.e., the excessive growth of plants and fluctuating levels of dissolved oxygen, are avoided.

The U.S. Environmental Protection Agency (EPA) requires each State to submit a nutrient development plan and develop nutrient criteria appropriate for their State waters (U.S. Environmental Protection Agency 2001). The Virginia Department of Environmental Quality (VADEQ) in its Nutrient Criteria Development Plan set forth a two step process to develop nutrient criteria for lakes and reservoirs - technical development of nutrient criteria and administrative adoption of the criteria - for each water body type. The VADEQ formed an Academic Advisory Committee (AAC) to provide advice on nutrient criteria development for lakes and reservoirs. Described below is a summary of the specific amendments to Virginia Water Quality Standard Regulations to add new numerical and narrative criteria to protect designated uses of man-made lakes and reservoirs as well as two natural lakes in the Commonwealth from the impacts of nutrients.

Modifications of Virginia's Nutrient Criteria

At its meeting on June 1, 2006, the Virginia State Control Board adopted amendments (9 VAC 25-260-5, 187, 310, and 480 to the Virginia's Water Quality Standards regulations to protect the designated uses of man-made lakes and reservoirs as well as the two natural lakes in the Commonwealth from the impacts of nutrients.

- Definitions in 9 VAC 25-260-5 for five terms added: "Algicides" means chemical substances, most commonly copper-based, used as a treatment method to control algae growths; "Epilimnion" means the upper layer of nearly uniform temperature in a thermally stratified man-made lake or reservoir listed in 9 VAC 25-260-187 B; "Lacustrine" means the zone within a lake or reservoir that corresponds to nonflowing

lake-like conditions such as those near the dam. The other two zones within a reservoir are riverine (flowing, river-like conditions) and transitional (transition from river to lake conditions); "Man-made lake or reservoir" means a constructed impoundment; "Natural lake" means an impoundment that is natural in origin.

- Clarification in 9 VAC 25-260-50 that for a thermally stratified man-made lake or reservoir in Class III, IV, V or VI waters that are listed in 9 VAC 25-260-187, these dissolved oxygen criteria apply only to the epilimnion in the lacustrine portion of the water body. When these waters are not stratified, the dissolved oxygen criteria apply throughout the water column.

- Creation of a Section 9 VAC 25-260-187 for numerical chlorophyll a and total phosphorus criteria for 116 listed man-made lakes to protect aquatic life and recreational designated uses from the impacts of nutrients. The total phosphorus criteria apply only if a specific man-made lake or reservoir received algicide treatment during the monitoring and assessment period of April 1 through October 31. Whether or not algicide treatments are used, the chlorophyll a criteria apply to all waters on the list. See Appendix A Table 1 for a list the chlorophyll a and total phosphorus criteria for the man-make lakes and reservoirs.

- Special Water Quality Standards in 9 VAC 25-260-310 for numerical nutrient criteria to maintain the current water quality of the two natural lakes (Mountain Lake and Lake Drummond) in Virginia with references in the River Basin Tables (9 VAC 25-260-480 and 540).

Federal Action

Under Section 303(c) of the Clean Water Act (CWA) and 40 CFR 131, States and authorized tribes have primary responsibility to develop and adopt water quality standards to protect their waters. As required by Section 303(c) of the CWA and 40 CFR 131, the EPA reviews new and revised surface water quality standards that have been adopted by States and authorized tribes. State water quality standards are not considered effective under the CWA until approved by EPA.

The Federal action being evaluated is the approval by the EPA of the new and revised provisions set forth in the VADEQ Water Quality Standards Regulations. These regulations, which have been established to protect public health, welfare and enhance water quality in Virginia, were adopted by at the Virginia State Control Board meeting on June 1, 2006.

In order to fulfill the goals of the Memorandum of Agreement (MOA), whose intent is to provide efficient mechanisms for improved interagency cooperation under Section 7 of the ESA, EPA will consult with the US Fish and Wildlife Service (FWS) on proposed and/or revised State aquatic life criteria. The agencies agree that it is prudent to examine the aquatic life criteria for protection of listed species and critical habitat, and realize the importance of conducting the

consultations on proposed and/or revised State criteria in a timely fashion so that any State-adopted aquatic life criteria are protective of that State's listed species and their critical habitat.

Action Area

EPA's approval of the Virginia Water Quality Standards applies to all waters of the United States within the Commonwealth under Federal jurisdiction. Jurisdiction over non-navigable, isolated, and intrastate waters would likely have to be determined on a case-by-case basis. The area evaluated for action is the surface waters of the Commonwealth. Waters of the Commonwealth are defined in Section Title 62.1 of the Waters of the State, Ports and Harbors Law as "water includes all waters, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction and which affect the public welfare."

Specifically, the action area includes the segments of the two natural lakes (Mountain Lake in Giles County and Lake Drummond, located with the boundaries of the Chesapeake and Suffolk in the Great Dismal Swamp) and the man-made lakes to which the adopted chlorophyll a and total phosphorous criteria apply (potential direct effects) and all waters adjacent to the lake segments including embayment's and waters immediately downstream from the lake segments (potential indirect effects). Appendix A Table 2 contains the location of each of the man-made lake and reservoirs.

Federally Listed Species and Critical Habitats

A list of all aquatic and aquatic-dependent threatened and endangered species within Virginia, and proposed species, and their designated and proposed critical habitat is included under Appendix A Table 3. EPA considered each species to determine whether the species are expected to be present in either the subject lakes for which the criteria is applicable (potential direct effects) or in the waters adjacent to the lakes, including embayments and downstream waters (potential indirect effects). Those species that have a limited exposure to water (i.e., terrestrial species) will not be affected by Virginia's nutrient criteria and, therefore, it is appropriate for EPA to make a 'no effect' finding on these species. Listed species that have more than a limited exposure to water are considered either aquatic or aquatic-dependent and, as such, are subject to consultation. EPA has identified no aquatic and only one aquatic-dependent species (Bald eagle) that has more than limited exposure to "Waters of Virginia," and which may be affected by the Virginia's nutrient criteria. The FWS has noted to EPA that while there is considerable federally designated critical habitat in Virginia – it is all streams designations, and not lakes and reservoirs. Therefore, a critical habitat analysis is omitted.

Manner in Which the Action May Affect

If there was a determination that these "may affect" any of the species present within the action area, the determination would be discussed in the section below, broken down by individual water body. Each Federally-listed species that may be affected would be discussed. In those instances, the revisions would be reviewed to see the manner in which the action may affect federally listed species. When the effect is either beneficial or insignificant then, the resulting

determination would be Not Likely to Adversely Affect. Adverse effects would lead to a determination of Likely to Adversely Affect. The remainder of the determinations would be No Effect based on either an absence of species in the action area or a determination that the criteria are not expected to have any potential direct or indirect effects on the species present. Revisions related to human health would be "No Discretion" because of their inapplicability to this consultation process.

EPA Determination

Virginia has set the chlorophyll a and phosphorus criteria for each lake using data and information, including historical monitoring data to sustain good to excellent fisheries. Concerning the one aquatic-dependent species (the bald eagle), they rely upon the lakes for feeding. The numeric nutrient criteria will not have any discernable affect on the food source for this species, nor would it have an effect on the species ability to obtain food. The EPA has determined that the recommended chlorophyll a and phosphorous criteria will not likely adversely affect the listed species evaluated in this document. Furthermore, the EPA has determined that the modification of Virginia's nutrient criteria will beneficially affect preferred habitat and food sources that the listed bald eagle depends on.

Concerning the Federally listed aquatic and aquatic-dependent species present within the waters adjacent to the subject lake segments including embayment's and downstream waters, the established criteria do not have an effect on the applicable narrative criteria for these waters which require full protection of the fish and aquatic life. That is, the applicable narrative criteria and its implementation have not changed and therefore these species are provided the same level protection afforded prior to the adoption of the criteria.

Appendix A TABLE 1

Man-made Lake or Reservoir Name	Location	Chlorophyll *a* (µg/L)	Total Phosphorus (µg/L)
Able Lake	Stafford County	35	40
Airfield Pond	Sussex County	35	40
Amelia Lake.	Amelia County	35	40
Aquia Reservoir (Smith Lake)	Staford Count	35	40
Bark Camp Lake (Corder Bottom Lake, Lee/Scott/Wise Lake)	Scott County	35	40
Beaver Creek Reservoir	Albemarle County	35	40
Beaverdam Creek Reservoir (Beaverdam Reservoir)	Bedford County	35	40
Beaverdam Reservoir	Loudoun County	35	40
Bedford Reservoir(Stony Creek Reservoir)	Bedford County	35	40
Big Cherry Lake	Wise County	35	40
Breckenridge Reservoir	Prince William County	35	40
Briery Creek Lake	Prince Edward County	35	40
Brunswick Lake (County Pond)	Brunswick County	35	40
Burke Lake	Fairfax County	60	40
Carvin Cove Reservoir	Botetourt County	35	40
Cherrystone Reservoir	Pittsylvania County	35	40
Chickahominy Lake	Charles City County	35	40
Claytor Lake	Pulaski County	25	20
Clifton Forge Reservoir (Smith Creek Reservoir)	Alleghany	35	20
Coles Run Reservoir	Augusta County	10	10
Curtis Lake	Stafford County	60	40
Diascund Creek Reservoir	New Kent County	35	40
Douthat Lake	Bath County	25	20
Elkhorn Lake	Augusta County	10	10
Emporia Lake (Meherrin Reservoir)	Greensville County	35	40
Fairystone Lake	Henry County	35	40
Falling Creek Reservoir	Chesterfield County	35	40
Fort Pickett Reservoir	Nottoway/Brunswick County	35	40
Gatewood Reservoir	Pulaski County	35	40
Georges Creek Reservoir	Pittsylvania County	35	40
Goose Creek Reservoir	Loudoun County	35	40
Graham Creek Reservoir	Amherst County	35	40
Great Creek Reservoir	Lawrenceville	35	40
Harrison Lake	Charles City County	35	40
Harwood Mills Reservoir	York County	60	40
Hidden Valley Lake	Washington County	35	40
Hogan Lake	Pulaski County	35	40
Holiday Lake	Appomattox County	35	40
Hungry Mother Lake	Smyth County	35	40
Hunting Run Reservoir	Spotsylvania County	35	40
J. W. Flannagan Reservoir	Dickenson County	25	20
Kerr Reservoir, Virginia portion(Buggs Island Lake)	Halifax County	25	30
Keysville Reservoir	Charlotte County	35	40
Lake Albemarle	Albemarle County	35	40
Lake Anna	Louisa County	25	30
Lake Burnt Mills	Isle of Wight County	60	40
Lake Chesdin	Chesterfield County	35	40
Lake Cohoon	Suffolk City	60	40
Lake Conner	Halifax County	35	40
Lake Frederick	Frederick County	35	40
Lake Gaston, (Virginia portion)	Brunswick County	25	30
Lake Gordon	Mecklenburg County	35	40
Lake Keokee	Lee County	35	40
Lake Kilby	Suffolk City	60	40
Lake Lawson	Virginia Beach City	60	40
Lake Manassas	Prince William County	35	40
Lake Meade	Suffolk City	60	40
Lake Moomaw	Bath County	10	10
Lake Nelson	Nelson County	35	40

TABLE 1 cont'd

Man-made Lake or Reservoir Name	Location	Chlorophyll a (µg/L)	Total Phosphorus (µg/L)
Lake Nottoway ((Lee Lake, Nottoway Lake)	Nottoway County	35	40
Lake Pelham	Culpeper County	35	40
Lake Prince	Suffolk City	35	40
Lake Robertson	Rockbridge County	35	40
Lake Smith	Virginia Beach City	60	40
Lake Whitehurst	Norfolk City	60	40
Lake Wright	Norfolk City	60	40
Laurel Bed Lake	Russell County	35	40
Lee Hall Reservoir (Newport News Reservoir)	Newport News City	60	40
Leesville Reservoir	Bedford County	25	30
Little Creek Reservoir	James City County	25	30
Little Creek Reservoir	Virginia Beach City	60	40
Little River Reservoir	Montgomery County	35	40
Lone Star Lake F (Crystal Lake)	Suffolk City	60	40
Lone Star Lake G (Crane Lake)	Suffolk City	60	40
Lone Star Lake I (Butler Lake)	Suffolk City	60	40
Lunenburg Beach Lake (Victoria Lake)	Town of Victoria	35	40
Lunga Reservoir	Prince William County	35	40
Martinsville Reservoir (Beaver Creek Reservoir)	Henry County	35	40
Mill Creek Reservoir	Amherst County	35	40
Modest Creek Reservoir	Town of Victoria	35	40
Motts Run Reservoir	Spotsylvania County	25	30
Mount Jackson Reservoir	Shenandoah County	35	40
Mountain Run Lake	Culpeper County	35	40
Ni Reservoir	Spotsylvania County	35	40
North Fork Pound Reservoir	Wise County	35	40
Northeast Creek Reservoir	Louisa County	35	40
Occoquan Reservoir	Fairfax County	35	40
Pedlar Lake	Amherst County	25	20
Phelps Creek Reservoir(Brookneal Reservoir)	Campbell County	35	40
Philpott Reservoir	Henry County	25	30
Ragged Mountain Reservoir	Albemarle County	35	40
Rivanna Reservoir(South Fork Rivanna Reservoir)	Albemarle County	35	40
Roaring Fork	Pittsylvania County	35	40
Rural Retreat Lake	Wythe County	35	40
Sandy River Reservoir	Prince Edward County	35	40
Shenandoah Lake	Rockingham County	35	40
Silver Lake	Rockingham County	35	40
Smith Mountain Lake	Bedford County	25	30
South Holston Reservoir	Washington County	25	20
Speights Run Lake	Suffolk City	60	40
Spring Hollow Reservoir	Roanoke County	25	20
Staunton Dam Lake	Augusta County	35	40
Stonehouse Creek Reservoir	Amherst County	60	40
Strasburg Reservoir	Shenandoah County	35	40
Stumpy Lake	Virginia Beach	60	40
Sugar Hollow Reservoir	Albemarle County	25	20
Swift Creek Reservoir	Chesterfield County	35	40
Switzer Lake	Rockingham County	10	10
Talbott Reservoir	Patrick County	35	40
Thrashers Creek Reservoir	Amherst County	35	40
Totier Creek Reservoir	Albemarle County	35	40
Townes Reservoir	Patrick County	25	20
Troublesome Creek Reservoir	Buckingham County	35	40
Waller Mill Reservoir	York County	25	30
Western Branch Reservoir	Suffolk City	25	20
Wise Reservoir	Wise County	25	20

TABLE 2

Location	Man-made Lake or Reservoir Name
Albemarle County	Beaver Creek Reservoir
	Lake Albemarle
	Ragged Mountain Reservoir
	Rivanna Reservoir(South Fork Rivanna Reservoir)
	Sugar Hollow Reservoir
	Totier Creek Reservoir
Alleghany	Clifton Forge Reservoir (Smith Creek Reservoir)
Amelia County	Amelia Lake
Amherst County	Graham Creek Reservoir
	Mill Creek Reservoir
	Pedlar Lake
	Stonehouse Creek Reservoir
	Thrashers Creek Reservoir
Appomattox County	Holiday Lake
Augusta County	Staunton Dam Lake
	Elkhorn Lake
	Coles Run Reservoir
Bath County	Douthat Lake
	Lake Moomaw
Bedford County	Beaverdam Creek Reservoir (Beaverdam Reservoir)
	Bedford Reservoir(Stony Creek Reservoir)
	Leesville Reservoir
	Smith Mountain Lake
Botetourt County	Carvin Cove Reservoir
Brunswick County	Brunswick Lake (County Pond)
	Lake Gaston, (Virginia portion)
Buckingham County	Troublesome Creek Reservoir
Campbell County	Phelps Creek Reservoir(Brookneal Reservoir)
Charles City County	Chickahominy Lake
	Harrison Lake
Charlotte County	Keysville Reservoir
	Falling Creek Reservoir
	Lake Chesdin
	Swift Creek Reservoir
Culpeper County	Lake Pelham
	Mountain Run Lake
Dickenson County	J. W. Flannagan Reservoir
Fairfax County	Burke Lake
	Occoquan Reservoir
Frederick County	Lake Frederick
Greensville County	Emporia Lake (Meherrin Reservoir)
Halifax County	Kerr Reservoir, Virginia portion(Buggs Island Lake)
	Lake Conner
Henry County	Fairystone Lake
	Martinsville Reservoir (Beaver Creek Reservoir)
	Philpott Reservoir
Isle of Wight County	Lake Burnt Mills
James City County	Little Creek Reservoir
Lawrenceville	Great Creek Reservoir
Lee County	Lake Keokee
Loudoun County	Beaverdam Reservoir
	Goose Creek Reservoir
Louisa County	Lake Anna
	Northeast Creek Reservoir
Mecklenburg County	Lake Gordon
Montgomery County	Little River Reservoir
Nelson County	Lake Nelson
New Kent County	Diascund Creek Reservoir

Location	Man-made Lake or Reservoir Name
Newport News City	
Norfolk City	Lee Hall Reservoir (Newport News Reservoir)
	Lake Whitehurst
Nottoway County	Lake Wright
Nottoway/Brunswick County	Lake Nottoway ((Lee Lake, Nottoway Lake)
Patrick County	Fort Pickett Reservoir
	Talbott Reservoir
Pittsylvania County	Townes Reservoir
	Cherrystone Reservoir
	Georges Creek Reservoir
Prince Edward County	Roaring Fork
	Briery Creek Lake
	Sandy River Reservoir
	Breckenridge Reservoir
	Lake Manassas
Pulaski County	Lunga Reservoir
	Claytor Lake
	Gatewood Reservoir
Roanoke County	Hogan Lake
Rockbridge County	Spring Hollow Reservoir
	Lake Robertson
	Shenandoah Lake
	Silver Lake
Russell County	Switzer Lake
Scott County	Laurel Bed Lake
Shenandoah County	Bark Camp Lake (Corder Bottom, Lee/Scott/Wise)
	Mount Jackson Reservoir
Smyth County	Strasburg Reservoir
Spotsylvania County	Hungry Mother Lake
	Hunting Run Reservoir
	Motts Run Reservoir
Stafford County	Ni Reservoir
	Able Lake
Staford Count	Curtis Lake
Suffolk City	Aquia Reservoir (Smith Lake)
	Lake Cohoon
	Lake Kilby
	Lake Meade
	Lake Prince
	Lone Star Lake F (Crystal Lake)
	Lone Star Lake G (Crane Lake)
	Lone Star Lake I (Butler Lake)
	Speights Run Lake
Sussex County	Western Branch Reservoir
Town of Victoria	Airfield Pond
	Lunenburg Beach Lake (Victoria Lake)
Virginia Beach	Modest Creek Reservoir
Virginia Beach City	Stumpy Lake
	Lake Lawson
	Lake Smith
Washington County	Little Creek Reservoir
	Hidden Valley Lake
Wise County	South Holston Reservoir
	Big Cherry Lake
	Wise Reservoir
Wythe County	North Fork Pound Reservoir
	Rural Retreat Lake
York County	Harwood Mills Reservoir
	Waller Mill Reservoir

Table 3: Federally-listed Aquatic and Aquatic-Dependent Species in Virginia

AMPHIBIANS		
Plethodon shenandoah	Shenandoah salamander	LE
BIRDS		
Charadrius melodus	Piping plover	LT
Haliaeetus leucocephalus	Bald eagle	LT
Picoides borealis	Red-cockaded woodpecker	LE
Sterna dougallii dougallii	Roseate tern	LE
CRUSTACEANS		
Antrolana lira	Madison Cave isopod	LT
Lirceus usdagalun	Lee County cave isopod	LE
FISHES		
Acipenser brevirostrum	Shortnose sturgeon**	LE
Cyprinella monacha	Spotfin chub	LT
Erimystax cahni	Slender chub	LT
Etheostoma percnurum	Duskytail darter	LE
Noturus flavipinnis	Yellowfin madtom	LT
Percina rex	Roanoke logperch	LE
Phoxinus cumberlandensis	Blackside dace	LT
INSECTS		
Cicindela dorsalis dorsalis	Northeastern beach tiger beetle	LT
Neonympha mitchelli francisci	St. Francis' satyr	LE
Nicrophorus americanus	American burying beetle	LE-EX
Pseudanophthalmus holsingeri	Holsinger's cave beetle	C
MAMMALS		
Corynorhinus townsendii virginianus	Virginia big-eared bat	LE
Felis concolor couguar	Eastern cougar	LE-EX
Glaucomys sabrinus coloratus	Virginia northern flying squirrel	LE
Glaucomys sabrinus fuscus	Virginia northern flying squirrel	LE
Myotis grisescens	Gray bat	LE
Myotis sodalis	Indiana bat	LE
Sciurus niger cinereus	Delmarva Peninsula fox squirrel	LE
MUSSELS		
Alasmidonta heterodon	Dwarf wedgemussel	LE
Cumberlandia monodonta	Spectaclecase	C
Cyprogenia stegaria	Fanshell	LE
Dromus dromas	Dromedary pearlymussel	LE
Epioblasma brevidens	Cumberlandian combshell	LE
Epioblasma capsaeformis	Oyster mussel	LE
Epioblasma torulosa gubernaculum	Green-blossom pearlymussel	LE-EX
Epioblasma florentina walkeri	Tan riffleshell	LE
Fusconaia cor	Shiny pigtoe	LE
Fusconaia cuneolus	Fine-rayed pigtoe	LE
Hemistena lata	Cracking pearlymussel	LE

Lampsilis abrupta	Pink mucket pearlymussel	LE-EX
Lemiox rimosus	Birdwing pearlymussel	LE
Lexingtonia dolabelloides	Slabside pearlymussel	C
Pegias fabula	Little-wing pearlymussel	LE
Plethobasus cyphyus	Sheepnose	C
Pleurobema collina	James spinymussel	LE
Pleurobema plenum	Rough pigtoe	LE
Ptychobranchus subtentum	Fluted kidneyshell	C
Quadrula cylindrica strigillata	Rough rabbitsfoot	LE
Quadrula intermedia	Cumberland monkeyface pearlymussel	LE
Quadrula sparsa	Appalachian monkeyface pearlymussel	LE
Villosa perpurpurea	Purple bean	LE
Villosa trabalis	Cumberland bean pearlymussel	LE-EX

REPTILES

Caretta caretta	Loggerhead sea turtle	** LT
Chelonia mydas	Green sea turtle	** LT
Dermochelys coriacea	Leatherback sea turtle	** LE
Eretmochelys imbricata	Hawksbill sea turtle	** LE
Lepidochelys kempii	Kemp's ridley sea turtle	** LE
Clemmys muhlenbergii	Bog turtle	LT(S/A)

PLANTS

Aeschynomene virginica	Sensitive joint-vetch	LT
Amaranthus pumilus	Seabeach amaranth	LT
Betula uber	Virginia round-leaf birch	LT
Cardamine micranthera	Small-anthered bittercress	LE
Echinacea laevigata	Smooth coneflower	LE
Helenium virginicum	Virginia sneezeweed	LT
Helianthus schweinitzii1	Schweinitz's sunflower	LE
Helonias bullata	Swamp pink	LT
Iliamna corei	Peter's Mountain mallow	LE
Platanthera integrilabia	White fringeless orchid	C
Platanthera leucophaea	Eastern prairie fringed orchid	LT
Ptilimnium nodosum	Harperella	LE
Rhus michauxii	Michaux's sumac	LE
Schwalbea americana	American chaffseed	LE-EX
Spiraea virginiana	Virginia spiraea	LT

SNAILS

Polygyriscus virginianus	Virginia fringed mountain snail	LE

KEY:
LE – Listed endangered.
LT- Listed threatened. PE - Proposed endangered. PT - Proposed threatened.
EX – Believed to be extirpated in Virginia. E(S/A) - Endangered due to similarity of appearance to another listed species.
C – Candidate. The Service has enough information to list the species as threatened or endangered, but this action is precluded by other listing activities.
* - Continued existence in the wild is in doubt.
** - Except for sea turtle nesting Habitat, principal responsibility for these species is vested with the National Oceanic and Atmospheric Administration's
Fisheries Service. Last Updated: May 20, 2004

REFERENCES

U.S. Environmental Protection Agency. April 2000. *Nutrient Criteria Technical Guidance Manual Lakes and Reservoirs.* Publication No. EPA-822-B00-001 U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency. November 14, 2001. *Development and Adoption of Nutrient Criteria into Water Quality Standards Technical* Memorandum. WQSP-01-01 Washington, D.C.

USFWS Threatened and Endangered Species System (TESS)
http://ecos.fws.gov/tess_public/StateListingAndOccurrence.do?state=VA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, Virginia 23061

June 15, 2007

Ms. Cheryl Atkinson
U.S. Environmental Protection Agency
Mail Code 3WP12
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Re: Virginia Lakes and Reservoirs Nutrient Criteria - 51411-2007-I-0377

Dear Ms. Atkinson:

The U. S. Fish and Wildlife Service (Service) is pleased to comment on the U.S. Environmental Protection Agency's (USEPA) biological evaluation of the revised nutrient criteria for lakes and reservoirs adopted by the Virginia State Water Control Board. The USEPA made a determination of not likely to adversely affect federally listed species pertaining to Virginia adopted nutrient criteria for lakes and reservoirs. The Service submits the following comments under the provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). The Fish and Wildlife Coordination Act authorizes the Service to provide assistance and cooperate with other Federal, State, and public and private agencies in the conservation of all fish and wildlife resources and their habitats.

Endangered Species Act Comment

A review of our records indicates that there are no known occurrences of federally listed species in lakes and reservoirs in Virginia. No federally designated critical habitat occurs within the area affected by the newly adopted criteria. We concur with the USEPA's finding presented in the biological evaluation that Virginia's recently adopted nutrient criteria will not adversely affect federally listed species.

Fish and Wildlife Coordination Act Comment

In the Service's February 22, 2005, letter (attached) to the Virginia Department of Environmental Quality, we supported Virginia's effort to develop and promulgate nutrient criteria for lakes and reservoirs. We also recommended establishment of reference conditions, as suggested in the *Nutrient Criteria Technical Guidance Manual - Lakes and Reservoirs* (USEPA

2000). Reference conditions are a critical component of developing criteria at appropriate levels. Most importantly, **reference conditions for nutrient-related variables such as phosphorus, nitrogen, and chlorophyll-a should represent lake conditions in the absence of anthropogenic disturbances and pollution.** Upon review of Virginia's adopted nutrient criteria, we note that the adopted nutrient criteria are well in exceedance, more than double, of the criteria concentrations recommended in USEPA's *Nutrient Criteria Technical Guidance Manual - Lakes and Reservoirs*. The adopted criteria appear to be set approximately at the 75 percentile of lake and reservoir nutrient observations, rather than at the USEPA recommended 25 percentile for protection of aquatic life uses. A search today of Virginia's Total Maximum Daily Load (TMDL) web page reveals many Virginia lake TMDL listings are due to dissolved oxygen impairment, with "natural causes" listed as the source of the impairment. Nutrient overloading causes and/or exacerbates dissolved oxygen deficits. The Service believes that the adopted criteria may be inadequate to return many lakes to fully supporting aquatic life uses year-round. We recommend that the lakes and reservoirs criteria be revised during the next Triennial Review, and the USEPA recommended 25 percentile be used to derive criteria that will restore the chemical, physical and biological integrity of the Commonwealth's lakes and reservoirs.

This concludes informal consultation between the U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency on Virginia's adoption of nutrient water quality criteria for lakes and reservoirs. We look forward to participating in the process to develop nutrient criteria for streams and rivers in Virginia. If there are any questions, please contact Cindy Kane of this office at (804) 693-6694, extension 109.

Sincerely,

Cynthia M. Kane

Acting for Karen L. Mayne
Supervisor
Virginia Field Office

cc:
VADEQ, Richmond, VA
(Ellen Gilinsky, Jean Gregory)

Literature Cited

U.S. Environmental Protection Agency. 2000. *Nutrient Criteria Technical Guidance Manual - Lakes and Reservoirs.* EPA 822-B00-001 USEPA, Office of Water, Washington, DC.